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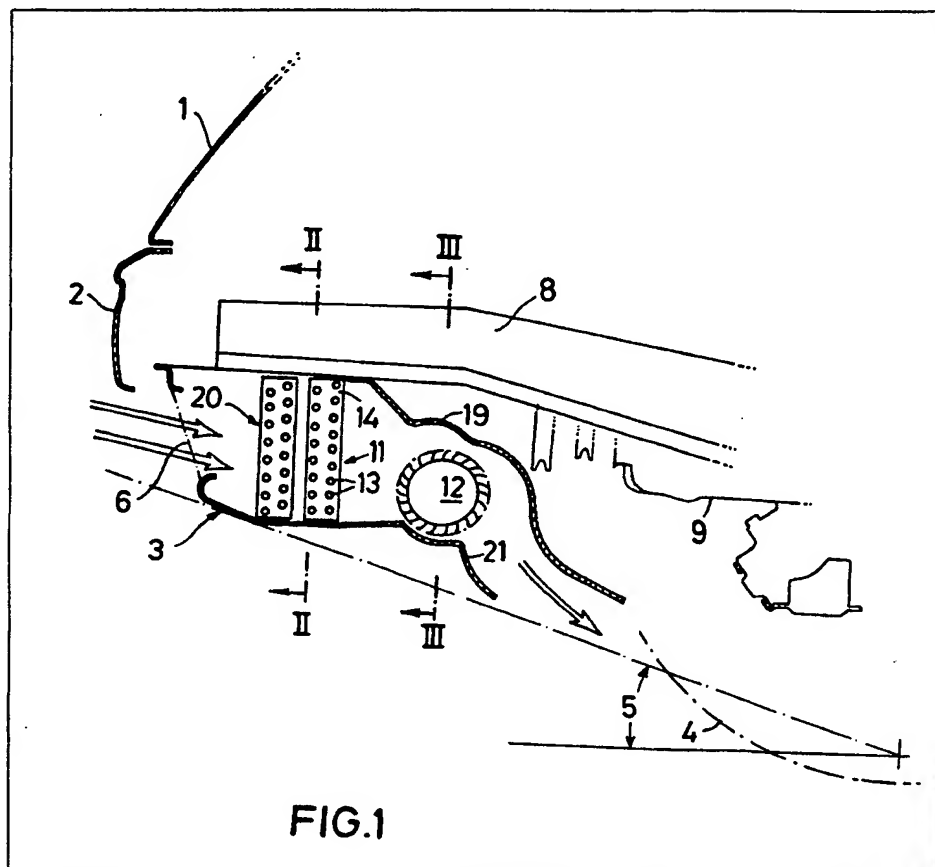
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(54) Engine cooling arrangement
for motor cars

(57) A motor car has a radiator (11) arranged transversely to the vehicle. The radiator (11) is low-lying, of substantial width and is disposed behind a nose apron (3) having air inlets (6) over its entire width. An air guide wall (19), which extends from the upper edge of the radiator (11) downwards to the rear between the engine bearers (8) keeps the spent air away from the engine (9) and carries it away under the bodywork. A fan (12) may be provided. As shown, an air conditioning condenser (20) is disposed adjacent the radiator.



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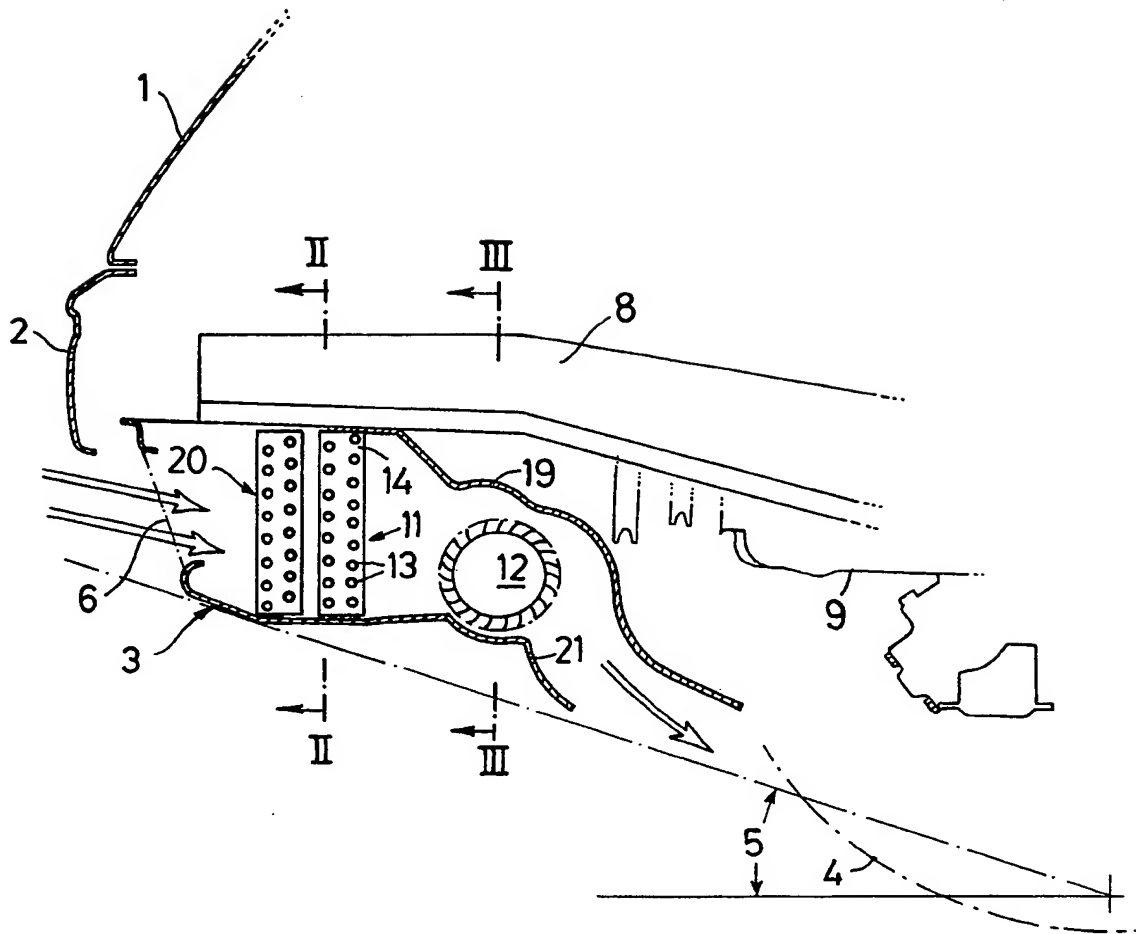
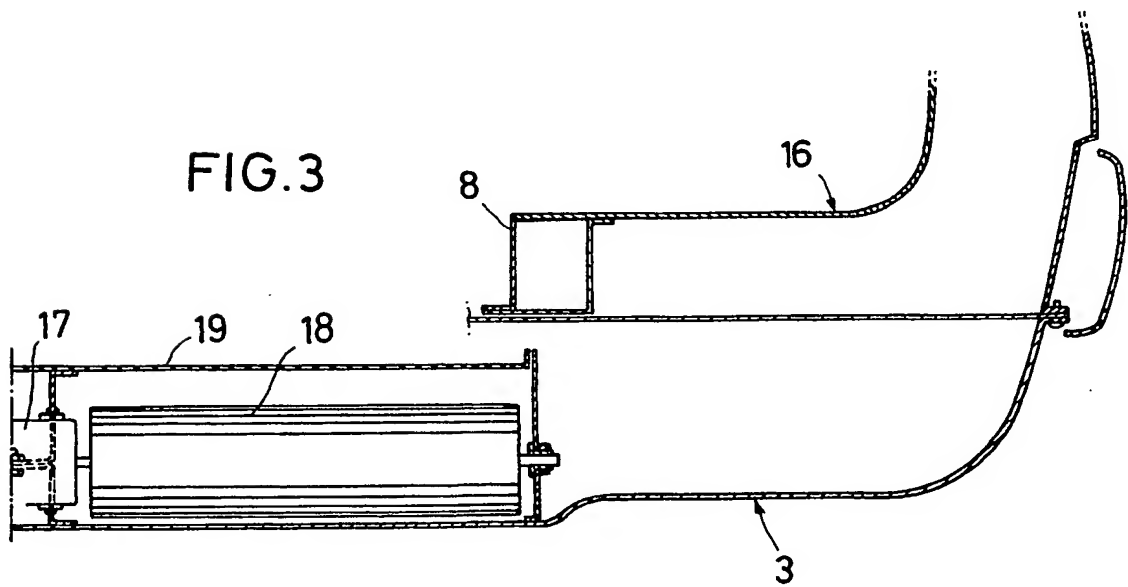
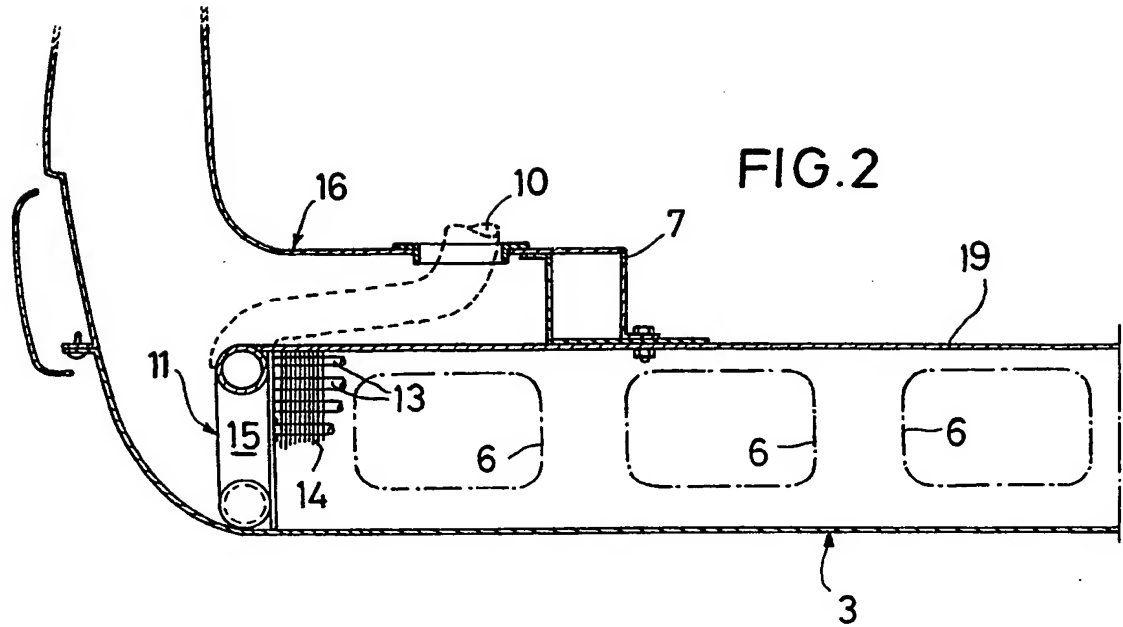


FIG.1

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SPECIFICATION

Engine cooling arrangement for motor cars

- 5 The invention relates to an engine cooling arrangement for motor cars.

According to the present invention, there is provided an engine cooling arrangement for a motor car, the arrangement comprising a low-lying radiator of substantial width arranged transversely to the vehicle and disposed behind a nose apron having air inlets over its entire width, and an air guide wall, which extends from the upper edge of the radiator downwards to the rear between the engine bearers and directs air away from the engine and under the bodywork.

- By virtue of the fact that a low-lying radiator of substantial width is disposed behind a nose apron having air inlets over its entire width, the heated spent air from the radiator is prevented from entering the engine space. In winter this would adversely affect the desired rapid heating of the internal combustion engine from cold and in summer it would obstruct the cooling of the engine—already made difficult by high temperatures outside—by heating the engine space.

- As a result of the invention, it may be possible to reduce the warming-up phase of the internal combustion engine in winter, which would improve the performance of the engine and the petrol consumption and would ensure at the same time that an adequate amount of heat is available for heating the passenger compartment.

- If a cross-current fan with one or two cylinders is disposed in front of or behind the radiator, the radiator may have only the slipstream passing through it when the cross-current fan is idling or an intensified flow passing through it when the cross-current fan is switched on.

- If the air guide wall is constructed as a fan housing to which the radiator fan, comprising an electric motor and one or two fan cylinders, is secured, the assembly costs for arranging the engine cooling of the motor car may be reduced.

- If the nose apron, the radiator, optionally a condenser of an air-conditioning unit, the radiator fan and the air guide wall are combined to form a pre-assembled component, a substantial simplification of the assembly of the engine cooling system to the motor car may be achieved.

The invention will now be described further, by way of example, with reference to the accompanying drawings, in which:

- 60 *Figure 1* is a vertical section in a plane parallel to the median plane of the vehicle;

Figure 2 is a section along the line II-II in Fig. 1, and

- 65 *Figure 3* is a section along the line III-III in Fig. 1.

- In Fig. 1, only the relevant parts of the front end of a motor car are shown. These parts are shown diagrammatically and are provided with reference numerals. In this case the front end comprises an engine bonnet 1 drawn sharply downwards, an adjacent bumper 2 and a nose apron 3 set back beneath the bumper in conventional manner. The nose apron 3 is constructed in such a way as to meet the necessary angle of slope 5 starting from the point of ground contact of the wheel 4. The nose apron 3 is provided with air inlets 6 over its entire width and may be constructed in a known manner as a front spoiler.

- Engine bearers 7 and 8, on which an internal combustion engine 9 is supported, extend approximately at the level of the bumper 2. The internal combustion engine 9 is connected to a radiator 11 by way of hose pipes, one of which is designated 10 in Fig. 2.

- The radiator 11 is preferably a so-called cross-current radiator, behind which a radiator fan 12 in the form of a tangential fan with two lateral fan cylinders is arranged.

- In detail, the radiator 11 comprises a plurality of horizontally extending water pipes 13 which are held together by a plurality of air guide fins 14 to form a nest of water pipes of which the lateral ends are closed by water compartments. In this case, the radiator 11 is constructed as a low-lying cross-current radiator of such width that it extends laterally as far as the wheel housing areas 16 of the bodywork.

- The radiator fan 12 has an electric motor 17 to which fan cylinders 18 may be connected on one or both sides. If fan cylinders 18 are provided on both sides of the electric motor 17, the radiator fan must be constructed in such a way, e.g. as a tangential fan, so that the slipstream can flow in as unobstructed a manner as possible when the fan is not operating. If a fan cylinder is provided on only one side, one side of the radiator 11 has only the slipstream passing through it, whereas the other side of the radiator 11 has an intensified flow passing through it where necessary when the fan is switched on.

- The arrangement of the radiator 11 and the fan 12 is enclosed at the bottom by the nose apron 3, and is closed off at the top by an air guide wall 19 which extends to the rear and downwards between the engine bearers 7 and 8 and keeps the spent air from the radiator away from the engine 9 and carries it away under the bodywork.

- A condenser 20 of correspondingly low and wide construction for an air-conditioning unit installed in the motor car may be arranged in front of the radiator 11.

- The components belonging to the engine cooling arrangement, such as the radiator 11, the radiator fan 12, the nose apron 3 and the

air guide wall 19 and where appropriate a condenser 20 may, with advantage, be combined to form a pre-assembled structural unit.

- This unit can be secured from below on to the engine bearers 7 and 8 or other parts of the bodywork by way of suitable securing means. The air guide wall 19 forms a wall of the fan casing suitably adapted to the radiator fan 12, while an inner fan casing wall 21 likewise adapted to the radiator fan 12 must be provided on the nose apron 3.

- As a whole, the engine cooling arrangement shown has the advantage that it allows a low, aerodynamic shaping of the front of the motor car without having to suffer the known difficulties of radiators installed with a pronounced inclination.

- The radiator 11 may be bent in accordance with the contour of the nose apron, and the radiator may also be constructed in one or more parts.

CLAIMS

1. An engine cooling arrangement for a motor car, the arrangement comprising a low-lying radiator of substantial width arranged transversely to the vehicle and disposed behind a nose apron having air inlets over its entire width, and an air guide wall, which extends from the upper edge of the radiator downwards to the rear between the engine bearers and directs air away from the engine and under the bodywork.

2. An engine cooling arrangement as claimed in Claim 1, wherein a cross-current fan is arranged in front of, or behind, the radiator.

3. An engine cooling arrangement as claimed in Claim 2, wherein the air guide wall forms a fan housing in which the radiator fan is disposed.

4. An engine cooling arrangement as claimed in any one of Claims 1 to 3, wherein the radiator, the air guide wall and the nose apron constructed accordingly are combined together to form a pre-assembled structural unit adapted to be secured from below on to the motor car.

5. An engine cooling arrangement as claimed in any one of Claims 1 to 4, wherein the radiator is bent in accordance with the contour of the nose apron.

6. An engine cooling arrangement as claimed in any one of Claims 1 to 5, wherein the radiator is constructed in several parts.

7. An engine cooling arrangement substantially as herein described with reference to, and as illustrated in the accompanying drawings.